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1.0 INTRODUCTION

SCS Consulting Group Ltd. has been retained by The Township of Woolwich to prepare a Master Servicing and Stormwater Management Report for the Stockyards Secondary Plan area.

1.1 Purpose of the Master Servicing and Stormwater Management Report

The Master Servicing and Stormwater Management Report (MSSR) has been prepared in support of the Preferred land use plan for the Stockyards Secondary Plan area to demonstrate how the proposed redevelopment can be serviced with water, sanitary and storm services.

1.2 Study Area

The Secondary Plan area is approximately 69 ha in size and is bound by Martin Creek on the west and north, Highway 86 and existing residential development on the east and existing industrial development in the City of Waterloo on the south (see **Figure 2.1**).

The existing subject lands are comprised of existing commercial developments and undeveloped open space areas. The site is located within the Grand River watershed in the Martin Creek and Forwell Creek subwatersheds. The central, northern and western portions are tributary to Martin Creek, while the south portion is tributary to Forwell Creek.

2.0 EXISTING SERVICING & STORMWATER MANAGEMENT

The following provides a summary of the existing servicing information related to the lands within the Stockyards Secondary Plan area. Specifically, information has been compiled related to existing conditions and infrastructure, as well as preliminary opportunities and constraints relating to sanitary servicing, water distribution, storm drainage, stormwater management, and utilities.

2.1 Existing Sanitary Sewer System

The municipal sanitary sewage collection and treatment system is a two-tiered responsibility. The Region owns and operates (under contract) the municipal wastewater treatment plants. The local municipalities own and maintain the collection system including pumping stations. The allocation of wastewater treatment is the responsibility of the municipalities.

There is an existing 200 mm diameter sanitary sewer located on Benjamin Road that connects into an existing 200 mm diameter sanitary sewer on Conrad Place at the south limit of the Secondary Plan Area (refer to **Figure 2.1**). There are existing 200 and 250 mm diameter sewers servicing the Smart Centres property that convey flows south to an existing 250 mm diameter sanitary sewer on Kumpf Drive. The existing sewers on Conrad Place and Kumpf Drive in the City of Waterloo convey flows to the Waterloo Wastewater Treatment Plant (WWTP).

The Waterloo WWTP is under the jurisdiction of the Region of Waterloo. The estimated serviced population is 107,623 (2003).

A Sanitary Master Plan was prepared for the City of Waterloo (Stantec, August 2015) which included existing and projected future flows from the Stockyards Secondary Plan Area. The flows associated with the 2014, 2019 and 2024 planning horizons at the two outlets from the Stockyards Secondary Plan Area (Conrad Place and Kumpf Drive sanitary sewers) are summarized below:

Table 2.1: Sanitary Master Plan Flows

Planning Horizon	Peak Flow (L/s)		Average Flow (L/s)	
	Conrad Place (MH 11908 (F47-1))	Kumpf Drive (MH 15639 (F38-4B))	Conrad Place (MH 11908 (F47-1))	Kumpf Drive (MH 15639 (F38-4B))
2014	4.6	6.0	2.3	2.9
2019	4.6	9.1	2.3	4.4
2024	4.6	9.1	2.3	4.4

2.1.1 Sanitary Flow Monitoring

Sanitary flow monitoring of the existing sewers on Benjamin Road and through the Smart Centres development was undertaken (by Norton Engineering) in 2019 and early 2020 and identified that the existing peak flow in the Benjamin Road sewer was approximately 10 L/s, while the capacity of this sewer is approximately 16 L/s and the existing peak flow in the Smart Centres sewer was approximately 2.5 L/s.

2.1.2 Cross Border Servicing Agreements

A Cross Border Servicing Agreement (CBSA) was established in the 1990s between the City of Waterloo, the Township of Woolwich and the owners of the Mercedes Corporation lands to provide sanitary servicing (via connection on Conrad Place) and water supply (via connection on Weber Street North) to the Mercedes Corporation lands. The CSBA was later amended to provide water servicing to two properties on the west side of Weber Street North (845 and 849 Weber Street North). Further in 2016, the CSBA was amended to allow water servicing to the property located at 865 Weber Street North.

A second CBSA was established in 2008 (and amended in 2014) between the City of Waterloo, the Township of Woolwich and the King/86 Developments Limited (SmartCentres) lands to provide sanitary and water services to the retail/commercial power centre via connections on Kumpf Drive. The agreement allowed for a maximum of 305,000 square feet GCFS of retail commercial development.

2.2 Existing Water Distribution System

The Region of Waterloo has jurisdiction over the potable drinking water supply for homes and businesses throughout the Region. Water servicing in the Region is based on a two-tier approach. The Region is responsible for water treatment, storage, pumping and the larger water distribution mains. The Township of Woolwich is responsible for the smaller distribution mains and for the service connections.

The existing water infrastructure within the Secondary Plan area includes (refer to **Figure 2.1**):

- ➔ a 300 mm diameter PVC watermain on Benjamin Road connecting to a 300 mm diameter PVC watermain on Weber Street North in the City of Waterloo;
- ➔ a 300 mm diameter PVC watermain through the SmartCentres development, connecting to a 300 mm diameter watermain on Kumpf Drive in the City of Waterloo;
- ➔ a 300 mm diameter PVC watermain along Farmer’s Market Drive between SmartCentres and Benjamin Road; and
- ➔ a 200 mm diameter PVC watermain along Farmer’s Market Drive between Benjamin Road and Weber Street North

The study area is within the City of Waterloo “Market” pressure zone.

2.3 Existing Storm Drainage and Stormwater Management

The study area is located within the Forwell Creek and Martin Creek subwatersheds of the Grand River watershed.

There is an existing municipally-owned stormwater management pond at the south limit of the Secondary Plan area on the west side of the CNR (see **Figure 2.1**). The pond was originally designed and constructed to provide stormwater management control for the Mercedes lands bound by Farmer’s Market Road to the north, Weber Street North to the west, the Township/City boundary to the south and the CNR to the east.

The pond was expanded in 2008 to accommodate drainage from the SmartCentres lands located east of the CNR for a total treated catchment area of 33.31 ha.

The stormwater management criteria established to date are summarized below:

- Erosion control is required for areas ultimately draining to Forwell Creek;
- Normal level of quality control (i.e. 70% TSS removal) is required for areas draining to Forwell Creek;
- Enhanced level of quality control (i.e. 80% TSS removal) is required for areas draining to Martin Creek;
- Post-development to pre-development peak flow control is required for all events up to and including the 100 year storm event.

2.4 Existing Utilities

Waterloo North Hydro, Bell Canada, Rogers Cable and Union Gas have existing plant in the surrounding area. Confirmation of adequate capacity for the proposed development will be sought from each of the Utilities.

The extent of system improvements, if any, will be determined upon completion of feasibility studies by each of the Utilities once detailed loading information is available.

Utility servicing of the study area will be designed and constructed in accordance with the Region of Waterloo and Area Municipalities Design Guidelines and Supplemental Specifications for Municipal Services (January 2008).

3.0 PROPOSED SERVICING ANALYSIS

The following provides an analysis of the potential sanitary and water servicing options for the lands within the Stockyards Secondary Plan area. The initial list of options identified at the January 10, 2018 Public Open House were screened and short-listed largely based on the technical feasibility of the options.

The short-listed options have been evaluated based on the following Servicing Infrastructure Guiding Principles from the Secondary Plan:

- Optimize the use of existing servicing infrastructure within the Stockyards Area;
- Provide efficient water, wastewater, and storm water management infrastructure in a fiscally responsible manner; and
- Develop a cross-border servicing strategy for the entirety of the Stockyards Area.

It is noted that a new cross-border servicing strategy between the Township of Woolwich and the City of Waterloo for the entirety of the Stockyards Area will be required for the servicing of any of the individual sites within the Secondary Plan Area, therefore, this guiding principle will not impact the analysis of the various servicing options.

A summary of the sanitary servicing options analysis is provided on **Table 3.1** and a summary of the water servicing options analysis is provided on **Table 3.2**, located at the end of this report.

For the purposed of the sanitary and water servicing options analysis, the Stockyards Area was divided into a number of 'sites' (refer to **Figure 2.1**) and the options outlined in this report address those sites which are currently unserviced.

3.1 Proposed Sanitary Servicing

3.1.1 Site 1

The topography of the land within Site 1 falls from south to north, away from King Street. In order to provide sanitary servicing to the site, several options are available including 1) a private on-site pumping station with a forcemain (or low pressure sanitary sewer system (LPSS)) to convey flows to existing municipal sewers in the Walmart development south of King Street, and 2) construct a deeper than typical gravity sewer west under the CNR, through sites 2a, 2b, and 2c to a proposed municipal pumping station located south of Martin Creek, south of the Weber Street North and King Street North intersection (adjacent the northwest corner of the Farmer's Market parking lot).

Option S1-2 involves a private on-site pumping station with a forcemain (or LPSS) conveying pumped flows to the existing 250 mm diameter gravity sanitary sewer at Farmer's Market Road which conveys flows south through the Walmart parking lot to Kumpf Drive in the City of Waterloo, refer to **Figure 3.1** for options.

Options S1-3, S1-4 and S1-5 involve constructing a deeper than typical gravity sewer west under the CNR, through sites 2a, 2b, and 2c to a proposed municipal pumping station located south of Martin Creek, south of the Weber Street North and King Street North intersection.

Under **Option S1-3**, a forcemain is proposed to pump flows from the municipal pumping station south on Weber Street North to a new gravity sanitary sewer on Weber Street North, which will cross under Forwell Creek and connect to the existing 375 mm diameter trunk sewer crossing Weber Street North adjacent Black Forest Place in the City of Waterloo.

Under **Option S1-4**, a forcemain is proposed to pump flows from the municipal pumping station south on Weber Street North and east along Farmer's Market Road to the existing 200 mm diameter sewer on Benjamin Road.

Under **Option S1-5**, a forcemain is proposed to pump flows from the municipal pumping station east on King Street North and south on Farmer's Market Road to the existing 250 mm diameter sewer in the Walmart development.

Based on the servicing infrastructure guiding principles, the **preferred option is S1-4**, as it results in the most cost-effective solution by minimizing new infrastructure costs. However, it is noted that, based on the recent sanitary flow monitoring analysis, there is little residual capacity available in the Benjamin Road sewer and capacity upgrades will be required to accommodate future development. Therefore, it is recommended that as part of the Environmental Assessment study for the proposed sanitary pumping station, further detailed study be undertaken to determine available capacities in the existing downstream receiving systems in both the Township and in the City of Waterloo, and this analysis may conclude that additional infrastructure improvements may be required in order to accommodate the proposed development, which may affect the feasibility and cost-effectiveness of the various options presented herein and result in a different preferred option.

3.1.2 Sites 2a, 2b, and 2c, 3, 4 and A

All sanitary servicing options for Sites 2a, 2b, 2c, 3, 4 and A (**Options S2-1, S2-2, S2-3, SA-1, SA-2, and SA-3**) involve constructing gravity sewers (west along King Street North for Sites 2a, 2b, and 2c and north along Weber Street North for Sites 3, 4 and A) to a proposed municipal pumping station located south of Martin Creek, south of the Weber Street North and King Street North intersection, refer to **Figure 3.2** for options.

Under **Options S2-1 and SA-1**, a forcemain is proposed to pump flows from the municipal pumping station south on Weber Street North to a new gravity sanitary sewer on Weber Street North, which will cross under Forwell Creek and connect to the existing 375 mm diameter trunk sewer crossing Weber Street North adjacent Black Forest Place in the City of Waterloo.

Under **Options S2-2 and SA-2**, a forcemain is proposed to pump flows from the municipal pumping station south on Weber Street North and east along Farmer's Market Road to the existing 200 mm diameter sewer on Benjamin Road.

Under **Options S2-3 and SA-3**, a forcemain is proposed to pump flows from the municipal pumping station east on King Street North and south on Farmer's Market Road to the existing 250 mm diameter sewer in the Walmart development.

Based on the servicing infrastructure guiding principles, the **preferred options are S2-2 and SA-2**, as it results in the most cost-effective solution by minimizing new infrastructure costs. However, it is noted that, based on the recent sanitary flow monitoring analysis, there is little residual capacity available in the Benjamin Road sewer and capacity upgrades will be required to accommodate future development. Therefore, it is recommended that as part of the Environmental Assessment study for the proposed sanitary pumping station, further detailed study be undertaken to determine available capacities in the existing downstream receiving systems in both the Township and in the City of Waterloo, and this analysis may conclude that additional infrastructure improvements may be required in order to accommodate the proposed development, which may affect the feasibility and cost-effectiveness of the various options presented herein and result in a different preferred option.

3.1.3 Site C

Option SC-1 involves constructing a new gravity sewer from the Weber Street North and Benjamin Road intersection, crossing under Forwell Creek to the existing 375 mm diameter trunk sewer crossing Weber Street North, adjacent Black Forest Place in the City of Waterloo. Refer to **Figure 3.3** for options.

Option SC-2 involves constructing a new gravity sewer from the Weber Street North and Benjamin Road intersection east along Benjamin Road to the existing 200 mm diameter sewer on Benjamin Road.

Based on the servicing infrastructure guiding principles, the **preferred option is Option SC-2** as it results in the most cost-effective solution by minimizing new infrastructure costs. However, it is noted that, based on the recent sanitary flow monitoring analysis, there is little residual capacity available in the Benjamin Road sewer and capacity upgrades will be required to accommodate future development. Therefore, it is recommended that further detailed study be undertaken to determine available capacities in the existing downstream receiving systems in both the Township and in the City of Waterloo, and this analysis may conclude that additional infrastructure improvements may be required in order to accommodate the proposed development, which may affect the feasibility and cost-effectiveness of the various options presented herein and result in a different preferred option.

3.1.4 Site F

Options SF-1 and SF-2 involve constructing a new gravity sewer south through the existing industrial lot at 7 Colby Court to the existing 200 mm diameter sanitary sewer at the north end of Colby Court. Based on the existing topography of the site, either fill will be required within the site to provide sufficient cover on the proposed sanitary sewer within the site (**Option SF-1**), or a private on-site private pumping station with forcemain, or a low pressure sanitary system (LPSS) connecting to the existing 200 mm diameter sanitary sewer on Colby Court will be required (**Option SF-2**). Refer to **Figure 3.4** for options.

Options SF-3 and SF-4 involve constructing a new gravity sewer connection under Highway 85 to the existing 250 mm diameter sanitary sewer at the southeast corner of the Walmart development, connecting to the existing sanitary sewer on Kumpf Drive in the City of Waterloo. Based on the existing topography of the site, fill will be required within the site to provide sufficient cover on the proposed sanitary sewer within the site (Option SF-3), or a

private on-site pumping station with forcemain, or a low pressure sanitary system (LPSS) connecting to the new gravity sewer under Highway 85 will be required.

Options SF-9 and SF-10 involve constructing a new gravity sewer connection south along King Street North and east along Northland Road to the existing 250 mm diameter sanitary sewer on Northland Road. Based on the existing topography of the site, fill will be required within the site to provide sufficient cover on the proposed sanitary sewer within the site (Option SF-9), or a private on-site pumping station with forcemain, or a low pressure sanitary system (LPSS) connecting to the new gravity sewer on King Street (Option SF-10) will be required.

Based on the servicing infrastructure guiding principles, the **preferred options are Options SF-1 and SF-2** as they result in the most cost-effective solution by minimizing new infrastructure costs. However, it is noted that further study is required to determine capacities in the existing downstream receiving systems in the Township and in the City of Waterloo, and this analysis may conclude that additional infrastructure improvements may be required in order to accommodate the proposed development, which may affect the feasibility and cost-effectiveness of the various options.

3.1.5 Proposed Sanitary Servicing Summary

The options analysis above only considers the servicing options internal to the Secondary Plan Area and does not consider the servicing capacity of the existing downstream sanitary sewer systems within the City of Waterloo. Based on discussions with the City of Waterloo, it was determined that the existing downstream sanitary sewers do not have the capacity to accommodate the ultimate flows associated with the full development within the Secondary Plan area. In addition, based on the recent sanitary flow monitoring analysis, there is little residual capacity available in the Benjamin Road sewer and capacity upgrades will be required to accommodate future development.

Therefore, additional analysis of the Benjamin Road sewer system and an update to the City of Waterloo's Sanitary Master Plan will be required to confirm downstream capacities and any required improvements to accommodate the increased flows from the Secondary Plan Area. Potential improvements may include (but are not limited to) upsizing existing downstream sewers, providing twinning of existing downstream sewers, and providing on-site detention and attenuation of sanitary flows within the Secondary Plan Area. The results of the additional analysis may result in different preferred servicing options from those described in this report.

3.2 Proposed Water Distribution

A Preliminary Water Analysis was completed by Municipal Engineering Solutions (September 2019) for the May 1, 2018 Draft Preferred Land Use Plan (refer to **Attachment A**). The preliminary analysis concluded that the existing water servicing system is not capable of adequately supplying the increased demands anticipated in the Stockyards redevelopment.

Based on the City of Waterloo Water Distribution Master Plan completed by GM Blueplan (April 2017), all of the Stockyards development area (except Area F east of Highway 85) should be moved to future water zone Wat5 when the pressure district boundary is adjusted. The modelling for the Stockyards area must be updated to confirm this finding when the Region's Wat5 modelling results become available in the future.

The boundary information provided by the Region indicated that the Stockyards development area will experience pressures below the lower limit (40 psi) during peak hour conditions. As this data is based on full build-out, it's possible that individual blocks could proceed before the zone switch is completed. Each block should be examined at the site servicing level to confirm if the proposed building(s) will need booster pumping to achieve pressures within the Region's criteria.

The analysis concluded that a 300 mm diameter watermain loop (from the existing 300 mm diameter watermain on Farmer's Market Road at Benjamin Road, west along Farmer's Market Road to Weber Street North, north along Weber Street North to King Street North, east along King Street North to Farmer's Market Road and south along Farmer's Market Road connecting into the existing 300 mm diameter watermain on Farmer's Market Road at the Walmart entrance) will be required to provide service to the future lands to be developed north of King Street North and west of Weber Street North (refer to Water Servicing Option – West 1 on **Figure 3.5**). It is noted that the existing 200 mm diameter watermain between Weber Street North and Benjamin Road will need to be removed and replaced with a 300 mm diameter watermain. This servicing solution applies to options W1-6, W2-3, W3,4-5, WA-5 and WC-6.

An alternative alignment for the required 300 mm diameter watermain on King Street North east of the CNR is to go south, along the east side of the CNR and connect into the existing 300 mm diameter watermain between the CNR and Farmer's Market Road (refer to Water Servicing Option – West 2 on **Figure 3.6**). It is noted that the existing 200 mm diameter watermain east of the CNR will need to be removed and replaced with the 300 mm diameter watermain. It is noted that the CNR railway corridor through the Stockyards area is owned by Waterloo Region. Similar to above, that the existing 200 mm diameter watermain between Weber Street North and Benjamin Road will also need to be removed and replaced with a 300 mm diameter watermain. This alternative servicing solution applies to options W1-8, W2-4, W3,4-6, WA-6 and WC-7.

3.2.1 Site C

Water servicing for the site will be via a connection to the existing 300 mm diameter watermain at the intersection of Weber Street North and Benjamin Road.

3.2.2 Site s 2a, 2b, 2c, 3, 4, A and 1

Water servicing for sites 2a, 2b, 2c, 3, 4, A and 1 will be via connections to the proposed 300 mm diameter watermain loop on Weber Street North and King Street North.

3.2.3 Site F

Option WF-1 involves constructing a new watermain through the existing industrial lot at 7 Colby Court and replacing the existing 250 mm diameter watermain on Colby Court with a 300 mm diameter watermain and connecting to the existing 300 mm diameter watermain on Colby Drive. Refer to Water Servicing Options – East **Figure 3.7** for options.

Option WF-2 involves constructing a new 300 mm diameter watermain under Highway 85 and connecting to the existing 300 mm diameter watermain at the southeast corner of the Walmart development.

Option WF-4 involves constructing a new 300 mm diameter watermain south along King Street North to the existing 300 mm diameter watermain at the intersection with Northland Road and Wyman Road.

Based on the servicing infrastructure guiding principles, **the preferred option is Option WF-1** as it results in the most cost-effective solution by minimizing new infrastructure costs.

3.2.4 Proposed Water Distribution Summary

It is noted that, depending on development phasing, some sites may proceed in advance of others with direct connections to existing watermains, or with construction of portions of the ultimately required new watermains. More detailed water servicing analysis will be required to confirm the water servicing requirements for each individual site, as development of those sites proceeds.

3.3 Proposed Storm Drainage and Stormwater Management

No new municipal stormwater management facilities are proposed. Stormwater management for the new development areas is proposed to be accommodated with on-site measures within each site that may include, but are not limited to, above ground (parking lot) storage, underground storage, low impact development measures, oil/grit separators, etc.